

The Regulations of Connecticut State Agencies are amended by adding section 22a-153-5, as follows:

**(NEW)**

**Sec. 22a-153-5. Radiation safety requirements for particle accelerators operated for human use.**

(a) Applicability.

This section shall apply to any person who receives, possesses, uses, transfers, owns or acquires a particle accelerator intended for human use in the state.

**(b) Registration.**

(1) No person shall operate a particle accelerator for human use except as authorized in a registration issued by the Commissioner.

(2) A person shall submit a written application to the Commissioner and obtain an issued registration prior to operating a particle accelerator for human use in the state. Such application shall be submitted on a form provided by the Department and shall include, but is not limited to, the following information:

- (A) A statement of the applicant's training and experience to use the accelerator in question for the purpose requested in a manner to minimize danger to public health and safety or property;
- (B) A description of the applicant's proposed or existing equipment, facilities and operating and emergency procedures that will adequately protect health and minimize danger to public health and safety or property;
- (C) Identification of training and experience of staff qualified to operate such a system;
- (D) Identification of one of the following entities:
  - (i) The RSO, or
  - (ii) Members of the applicant's radiation safety committee that will approve in advance a proposal for the use of a particle accelerator;
- (E) A description of the applicant's training program for operators of a particle accelerator system; and
- (F) Any other information requested by the Commissioner.

(3) The Commissioner will issue a registration for the use of a particle accelerator to an applicant of a complete application if the Commissioner determines:

- (A) The applicant's proposed program for use of a particle accelerator is adequate to protect public health and safety;
- (B) The applicant has appointed a medical committee of at least three members to evaluate all proposals for research, diagnostic and therapeutic use of a particle accelerator whenever deemed necessary by the Commissioner. Membership of the committee should include physicians expert in internal medicine, hematology, therapeutic radiology and a person experienced in depth dose calculations and protection against radiation;
- (C) The individuals designated on the application as the users have substantial training and experience in deep therapy techniques or in the use of particle accelerators to treat humans; and
- (D) The individual designated on the application as the user is a physician.

**(c) Restrictions on operation.**

(1) No registrant shall permit any individual to act as an operator of a particle accelerator until such individual:

- (A) Has been instructed in radiation safety and has demonstrated an understanding thereof;
- (B) Has received instruction concerning and has access to copies of and instruction in the requirements of applicable state regulations, registration conditions and the registrant's operating and emergency procedures, and has demonstrated understanding thereof; and
- (C) Has demonstrated competence to use a particle accelerator and related equipment.

(2) The radiation safety committee or the radiation safety officer shall have the authority to terminate the operations at a particle accelerator facility if such action is deemed necessary to minimize danger to public health and safety or property.

**(d) Shielding and safety design requirements.**

(1) Each registrant shall consult a qualified expert, approved as such by the Commissioner, in the design of a particle accelerator installation.

(2) When an accelerator is first capable of producing radiation, each registrant shall have a qualified expert, approved as such by the Commissioner, perform a radiation survey.

(3) Each registrant of a particle accelerator installation shall include such primary and secondary barriers necessary to comply with section 22a-153-2(d) of the Regulations of Connecticut State Agencies.

(e) Each registrant of a particle accelerator shall provide for the following controls and interlock systems:

(1) Clearly identified and easily discernible instrumentation, readouts and controls on the particle accelerator control console;

(2) On each entrance into a target room or other high radiation area, a safety interlock that shuts down the particle accelerator under conditions of barrier penetration;

(3) A circuit on each safety interlock that allows such to operate independently of all other safety interlocks;

(4) All safety interlocks designed so that any defect or component failure in the safety interlock system prevents operation of the accelerator;

(5) A safety interlock system designed to prevent resumption of operation of the accelerator after the interlock has been tripped only by manually resetting controls at the position where the safety interlock has been tripped and, lastly, at the main control console; and

(6) In all high radiation areas, an easily identifiable scram button or other emergency power cutoff switch. Such a cutoff switch shall include a manual reset so that the accelerator cannot be restarted from the accelerator control console without resetting the cutoff switch.

(f) Each registrant of a particle accelerator shall provide for the following warning devices:

(1) Easily observable warning lights on each location designated as high radiation area and each entrance to such location. Such warning lights shall operate only when radiation is being produced;

(2) An audible warning device on each high radiation area except in a facility designed for human exposure. Such warning device shall be clearly discernible in all high radiation areas and shall be activated for 15 seconds prior to the possible creation of such high radiation; and

(3) Barriers, temporary or otherwise, and pathways leading to high radiation areas that are posted in accordance with section 22a-153-2(e)(8) of the Regulations of Connecticut State Agencies.

(g) Each registrant of a particle accelerator shall provide for the following operation procedures:

- (1) Measures to secure the particle accelerator when not in operation to prevent unauthorized use;
- (2) Measures to ensure that the safety interlock system is not used to turn off the accelerator beam except in an emergency;
- (3) Checks for proper operation of all safety and warning devices, including interlocks, at intervals not to exceed three months. Results of such tests shall be maintained at the accelerator facility for inspection by the Commissioner upon request;
- (4) Current electrical circuit diagrams of the accelerator and the associated safety interlock systems maintained for inspection by the Commissioner upon request and available to the operator at each accelerator facility;
- (5) Any necessary action taken intentionally to bypass a safety interlock or interlocks shall be:
  - (A) Authorized by the radiation safety committee or radiation safety officer,
  - (B) Recorded as to time, date and reason in a permanent log and in a notice posted at the accelerator control console, and
  - (C) Terminated as soon as possible; and
- (6) Maintenance of a copy of the current operating and the emergency procedures at the accelerator control panel.

(h) Each registrant of a particle accelerator shall provide for radiation monitoring as follows:

- (1) Appropriate portable monitoring equipment that is operable and has been appropriately calibrated for the radiations being produced at the facility shall be available at each particle accelerator facility. Such equipment shall be tested for proper operation daily and calibrated at intervals not to exceed one year and after each servicing and repair;
- (2) A radiation protection survey performed and documented by a qualified expert, designated as such by the Commissioner, when changes have been made in shielding, operation, equipment or occupancy of adjacent areas;
- (3) Continuous monitoring of radiation levels in all high radiation areas. Continuous monitoring devices shall be electrically independent of the accelerator control and safety interlock systems and capable of providing a readout at the control panel;

- (4) Calibration of all area monitors at intervals not to exceed one year and after each servicing and repair;
  - (5) Whenever applicable, periodic surveys to determine the amount of airborne particulate radioactivity present;
  - (6) Whenever applicable, periodic smear surveys to determine the degree of contamination;
  - (7) All surveys shall be made in accordance with the written procedures established by a qualified expert, designated as such by the Commissioner, or by the radiation safety officer; and
  - (8) Records of all radiation protection surveys, calibrations and instrumentation tests maintained at the accelerator facility for inspection by the Commissioner.
- (i) Each registrant of a particle accelerator shall provide for ventilation systems as follows:
- (1) Provide for ventilation systems to ensure that personnel entering any area where airborne radioactivity may be produced will not be exposed to airborne radioactive material in excess of those limits specified in 22a-153-2, Appendix A, Table I of the regulations of Connecticut State Agencies; and
  - (2) Not vent, release or otherwise discharge airborne radioactive material to an unrestricted area that exceeds the limits specified in 22a-153-2, Appendix A, Table II of the regulations of Connecticut State Agencies, except as authorized pursuant to sections 22a-153-2(f)(2)(E) through 22a-153-2(f)(2)(G) of the Regulations of Connecticut State Agencies. For purposes of this subsection, a registrant may average concentrations over a period not greater than one year. Every effort should be made to maintain releases of radioactive material to unrestricted areas as far below applicable limits as is reasonably achievable.

**Statement of purpose:** This section establishes procedures for the registration and use of particle accelerators.